Signal conversion board for analog I/O

SC-AIO1604G User's Manual

CONTEC CO.,LTD.

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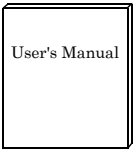
The product consists of the items listed below. Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer.

Product Configuration List

- Board…1
- User's Manual…1



User's Manual

Board

⚠ CAUTION

- Use this product in the specified environment (temperature and humidity).
- Do not use or store the product in a location exposed to extremely high or low temperature or susceptible to rapid temperature changes.
  For example: - Do not exposure to direct sunlight
  - In the vicinity of a heat source
- CONTEC will bear no responsibility for any problems, etc., resulting from modifying this product.
- When carrying the product, be careful not to apply direct vibration or shock to the product.
- The information in this document is subject to change without notice.
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About the Product

Signal Conditioner SC Series can reduce the type and number of measurement / control board of PC side by converting the signal and circuit being coexisted by the signal and circuit spec. when measuring and controlling with multiple external devices.
You can easily build the system without the original circuit by using the Signal Conditioner SC Series conversion board.

This product is a signal conversion board for a signal conditioner (signal conversion) SC Series analog I/O. For each channel, this product can be set by using one of 6 types of range (Bipolar ±10V, ±5V, ±2.5V, Unipolar 0 - 10V, 0 - 5V, 4 - 20mA) according to the analog input / output signal on the external device. According to the counter signal on external device, this product can be set to isolation/ non-isolation for each channel.

Features

- **Range settings for each channel are supported according to the analog signal on external device.**

According to the analog signal on external device, range settings (Bipolar ±10V, ±5V, ±2.5V, Unipolar 0 - 10V, 0 - 5V, 4 - 20mA) can be done for each channel.

In the analog signal from the external device side, all the setting ranges are converted to the voltage of bipolar ±10V and then are output to the PC side (analog I/O board).

In the analog signal from the PC side (analog I/O board), the voltage of bipolar ±10V range is converted to the voltage/current of setting range and then output to the external device side.
Switching the range can be done using the jumper.

- **According to the counter signal on external device, isolated/non-isolated settings can be done for each channel.**

According to the counter signal on external device, this product can be set to isolation/ non-isolation for each channel. Counter signal to the PC (analog I/O board) side is non-isolation.

Switching the range can be done using the jumper.

⚠ CAUTION

- Note that you cannot use AIO-163202F-PE, ADA16-32/2(PCI)F, ADA16-32/2(CB)F, AI-1664LA-LPE, AO-1608L-LPE, AO-1616L-LPE, AD16-64(LPCI)LA, DA16-8(LPCI)L, DA16-16(LPCI)L in the specification exceeding that of signal conditioner.
- I/O boards by analog F, L series correspond to the up count operation and those of analog M series correspond to the up down count operation.

Setup Hardware

Name of each parts

Figure 1 shows the names of major parts on the board.

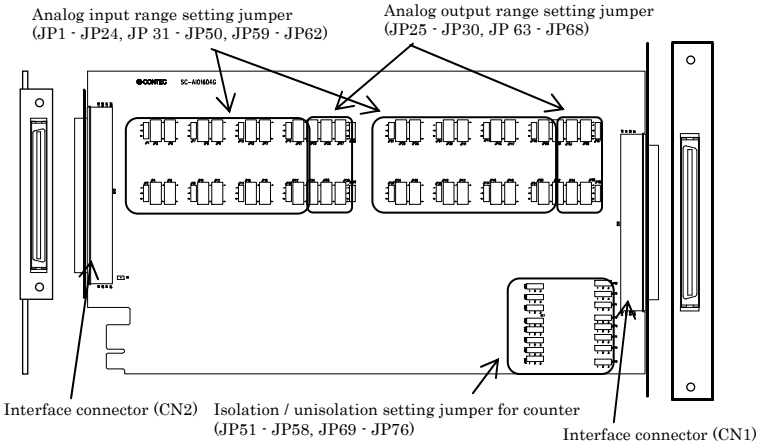

Analog input range setting jumper
(JP1 - JP24, JP 31 - JP50, JP59 - JP62)
Analog output range setting jumper
(JP25 - JP30, JP 63 - JP68)
Interface connector (CN2)
Isolation / unisolation setting jumper for counter
(JP51 - JP58, JP69 - JP76)
Interface connector (CN1)

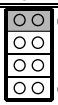
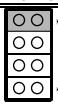
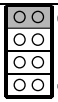
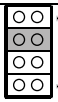
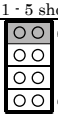
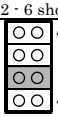
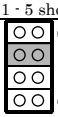
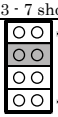
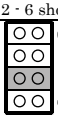
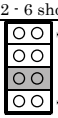
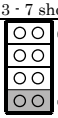
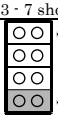
Figure 1. Component Locations

CN1 : The connector that connects with the external device side.
CN2 : The connector that connects with the PC (analog I/O board) side.

Setting Method

Setting the Analog Input Range

The analog input range can be set for each channel. Switching the range can be done using the jumper. For setting the analog input range, configure the jumper according to the table below.

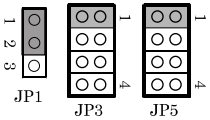
Analog Input	JP A	JP B	JP C
Voltage Input ±10V (Factory setting)	1 - 2 short	 1 - 5 short	 1 - 5 short
Voltage Input ±5V	1 - 2 short	 1 - 5 short	 2 - 6 short
Voltage Input ±2.5V	1 - 2 short	 1 - 5 short	 3 - 7 short
Voltage Input 0V - 10V	1 - 2 short	 2 - 6 short	 2 - 6 short
Voltage Input 0V - 5V	1 - 2 short	 3 - 7 short	 3 - 7 short
Current Input 4mA - 20mA	2 - 3 short	 4 - 8 short	 4 - 8 short

Correspondences between the jumpers and channels in the above table are summarized in the table below.

	Channel 00	Channel 01	Channel 02	Channel 03	Channel 04	Channel 05	Channel 06	Channel 07
JP A	JP 1	JP 2	JP 7	JP 8	JP 13	JP 14	JP 19	JP 20
JP B	JP 3	JP 4	JP 9	JP 10	JP 15	JP 16	JP 21	JP 22
JP C	JP 5	JP 6	JP 11	JP 12	JP 17	JP 18	JP 23	JP 24

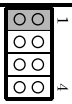
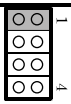
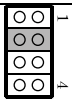
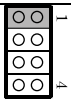
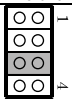
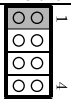
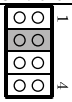
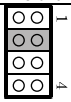
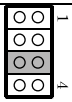
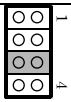
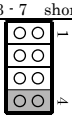
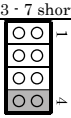
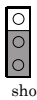
	Channel 08	Channel 09	Channel 10	Channel 11	Channel 12	Channel 13	Channel 14	Channel 15
JP A	JP 31	JP 32	JP 37	JP 38	JP 43	JP 44	JP 49	JP 50
JP B	JP 33	JP 34	JP 39	JP 40	JP 45	JP 46	JP 59	JP 60
JP C	JP 35	JP 36	JP 41	JP 42	JP 47	JP 48	JP 61	JP 62

Ex.)The jumper settings in the right figure shows the input range of the channel 0 set to ±10V.



Setting the Analog Output Range

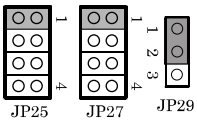
The analog output range can be set for each channel. Switching the range can be done using the jumper. For setting the analog output range, configure the jumper according to the table below.

Analog Output	JP A	JP B	JP C
Voltage Output ±10V (Factory setting)	 1 - 5 short	 1- 5 short	1 - 2 short
Voltage Output ±5V	 2 - 6 short	 1 - 5 short	1 - 2 short
Voltage Output ±2.5V	 3 - 7 short	 1 - 5 short	1 - 2 short
Voltage Output 0V - 10V	 2 - 6 short	 2 - 6 short	1 - 2 short
Voltage Output 0V - 5V	 3 - 7 short	 3 - 7 short	1 - 2 short
Current Output 4mA - 20mA	 4 - 8 short	 4 - 8 short	 2 - 3 short

Correspondences between the jumpers and channels in the above table are summarized in the table below.

	Channel 00	Channel 01	Channel 02	Channel 03
JP A	JP 25	JP 26	JP 63	JP 64
JP B	JP 27	JP 28	JP 65	JP 66
JP C	JP 29	JP 30	JP 67	JP 68

Ex.)The jumper settings in the right figure shows the output range of the channel 0 set to ±10V.



Setting the Counter

For the counter, isolated/non-isolated connection is supported for each channel. Switching between isolated/unisolated can be done using the jumper.

For setting the counter, configure the jumper according to the table below.

Isolation	Unisolation
 1 2 3 1 - 2 short (Factory setting)	 1 2 3 2 - 3 short

For the jumper settings that correspond to the channels, refer to the tables below.
Ensure that all of the 8 jumpers are set to the same.

Channel 00	JP 51	JP 52	JP 53	JP 54	JP 69	JP 70	JP 71	JP 72
Channel 01	JP 55	JP 56	JP 57	JP 58	JP 73	JP 74	JP 75	JP 76

Connection at the time of isolation setting

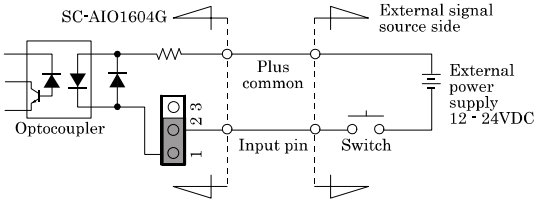


Figure 2. Connecting counter input signal (CNT Input A0, A1, B0, B1, Z0, Z1) (at the time of isolation setting)

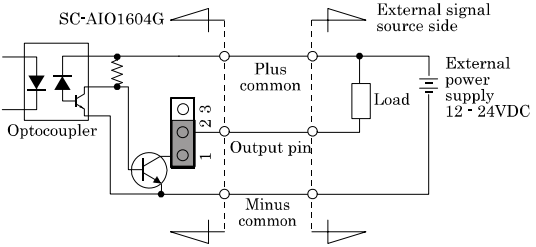


Figure 3. Connecting control output signal (CNT Output 00, 01) (at the time of isolation setting)

Connection at the time of non-isolation setting

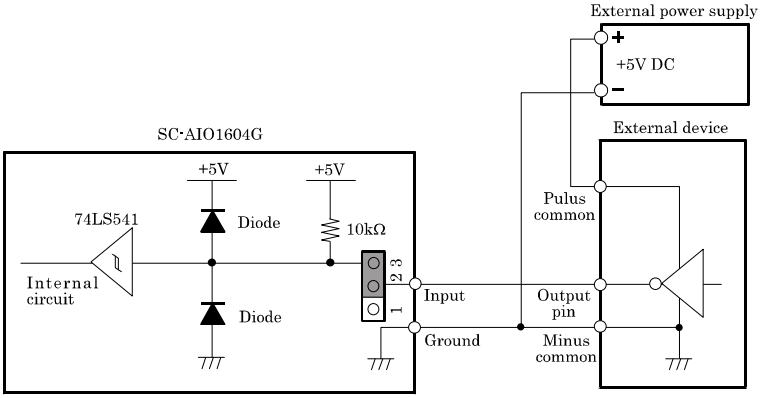


Figure 4. Connecting counter input signal (CNT Input A0, A1, B0, B1, Z0, Z1) (at the time of non-isolation setting)

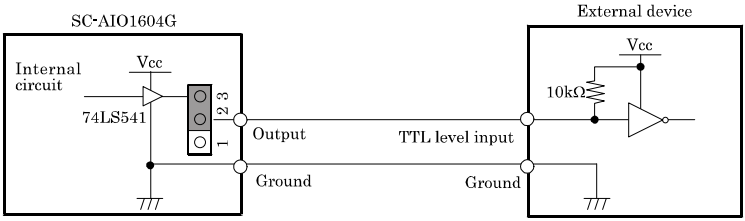


Figure 5. Connecting control output signal (CNT Output 00, 01) (Connection Example to TTL level Input circuit at the time of non-isolation setting)

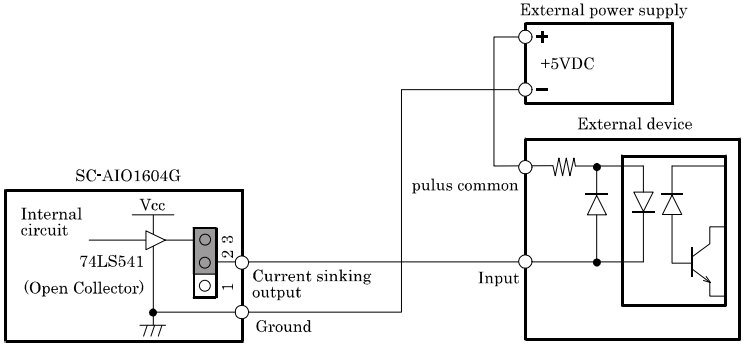


Figure 6. Connecting control output signal (CNT Output 00, 01) (Connection Example to isolation input circuit at the time of non-isolation setting)

Connection Method

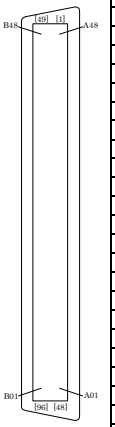
Signal Connection

Analog I/O board side (CN2)			External device side (CN1)	
A48	Analog Output 00	Range conversion circuit	A01	Analog Output 00
A46	Analog Output 01	Range conversion circuit	A03	Analog Output 01
A44	Analog Input 00	Range conversion circuit	A05	Analog Input 00
A42	Analog Input 01	Range conversion circuit	A07	Analog Input 01
A38	Analog Input 02	Range conversion circuit	A09	Analog Input 02
A36	Analog Input 03	Range conversion circuit	A11	Analog Input 03
A32	Analog Input 04	Range conversion circuit	A13	Analog Input 04
A30	Analog Input 05	Range conversion circuit	A15	Analog Input 05
A26	Analog Input 06	Range conversion circuit	A17	Analog Input 06
A24	Analog Input 07	Range conversion circuit	A19	Analog Input 07
A18	Digital Input 00		A21	Digital Input 00
A17	Digital Input 01		A22	Digital Input 01
A16	Digital Input 02		A25	Digital Input 02
A15	Digital Input 03		A26	Digital Input 03
A14	Digital Input 04		A27	Digital Input 04
A13	Digital Input 05		A28	Digital Input 05
A12	Digital Input 06		A31	Digital Input 06
A11	Digital Input 07		A32	Digital Input 07
A10	AI Control Signal OutPut00		A33	AI Control Signal OutPut00
A09	AI Control Signal OutPut01		A34	AI Control Signal OutPut01
A07	AI External Sampling Clock Input		A39	AI External Sampling Clock Input
A06	AI External Stop Trigger Input		A37	AI External Stop Trigger Input
A05	AI External Start Trigger Input		A35	AI External Start Trigger Input
A04	CNT Input A0	Isolation / non-isolation conversion circuit	A45	CNT Input A0
A03	CNT Input B0	Isolation / non-isolation conversion circuit	A43	CNT Input B0
A02	CNT Input Z0	Isolation / non-isolation conversion circuit	A44	CNT Input Z0
A01	CNT Output 00		B46	CNT Output 00
B48	Analog Output 02	Range conversion circuit	B01	Analog Output 02
B46	Analog Output 03	Range conversion circuit	B03	Analog Output 03
B44	Analog Input 08	Range conversion circuit	B05	Analog Input 08
B42	Analog Input 09	Range conversion circuit	B07	Analog Input 09
B38	Analog Input 10	Range conversion circuit	B09	Analog Input 10
B36	Analog Input 11	Range conversion circuit	B11	Analog Input 11
B32	Analog Input 12	Range conversion circuit	B13	Analog Input 12
B30	Analog Input 13	Range conversion circuit	B15	Analog Input 13
B26	Analog Input 14	Range conversion circuit	B17	Analog Input 14
B24	Analog Input 15	Range conversion circuit	B19	Analog Input 15
B18	Digital Output 00		B21	Digital Output 00
B17	Digital Output 01		B22	Digital Output 01
B16	Digital Output 02		B25	Digital Output 02
B15	Digital Output 03		B26	Digital Output 03
B14	Digital Output 04		B27	Digital Output 04
B13	Digital Output 05		B28	Digital Output 05
B12	Digital Output 06		B31	Digital Output 06
B11	Digital Output 07		B32	Digital Output 07
B10	AO Control Signal OutPut00		B34	AO Control Signal OutPut00
B09	AO Control Signal OutPut01		B33	AO Control Signal OutPut01
B07	AO External Sampling Clock Input		B39	AO External Sampling Clock Input
B06	AO External Stop Trigger Input		B37	AO External Stop Trigger Input
B05	AO External Start Trigger Input		B35	AO External Start Trigger Input
B04	CNT Input A1	Isolation / non-isolation conversion circuit	A47	CNT Input A1
B03	CNT Input B1	Isolation / non-isolation conversion circuit	A46	CNT Input B1
B02	CNT Input Z1	Isolation / non-isolation conversion circuit	A48	CNT Input Z1
B01	CNT Output 01		B45	CNT Output 01
A21,A22,A23,A25,A27,A28,A29,A31,A33,A34,A35,A37,A39,A40,A41,A43,A45,A47,B21,B22,B23,B25,B27,B28,B29,B31,B33,B34,B35,B37,B39,B40,B41,B43,B45,B47	Analog Ground		A02,A04,A06,A08,A10,A12,A14,A16,A18,A20,B02,B04,B06,B08,B10,B12,B14,B16,B18,B20	Analog Ground
A08,A19,A20,B08,B19,B20	Digital Ground		A23,A24,,A29,A30,A36,A38,A40,B23,B24,B29,B30,B36,B38,B40	Digital Ground
			B44	Plus common 00
			B48	Plus common 01
			B43	Minus common 00
			B47	Minus common 01
			A41,A42,B41,B42	N.C.

Connector Pin Assignment on External Device (CN1)

Pin Assignments of Interface Connector (CN1)

Plus common 01	B48		A48	CNT Input Z1
Minus common 01	B47		A47	CNT Input A1
CNT Output 00	B46		A46	CNT Input B1
CNT Output 01	B45		A45	CNT Input A0
Plus common 00	B44		A44	CNT Input Z0
Minus common 00	B43		A43	CNT Input B0
N.C.	B42		A42	N.C.
N.C.	B41		A41	N.C.
Digital Ground	B40		A40	Digital Ground
AO External Sampling Clock Input	B39		A39	AI External Sampling Clock Input
Digital Ground	B38		A38	Digital Ground
AO External Stop Trigger Input	B37		A37	AI External Stop Trigger Input
Digital Ground	B36		A36	Digital Ground
AO External Start Trigger Input	B35		A35	AI External Start Trigger Input
AO Control Signal OutPut00	B34		A34	AI Control Signal OutPut01
AO Control Signal OutPut01	B33		A33	AI Control Signal OutPut00
Digital Output 07	B32		A32	Digital Input 07
Digital Output 06	B31		A31	Digital Input 06
Digital Ground	B30		A30	Digital Ground
Digital Ground	B29		A29	Digital Ground
Digital Output 05	B28		A28	Digital Input 05
Digital Output 04	B27		A27	Digital Input 04
Digital Output 03	B26		A26	Digital Input 03
Digital Output 02	B25		A25	Digital Input 02
Digital Ground	B24		A24	Digital Ground
Digital Ground	B23		A23	Digital Ground
Digital Output 01	B22		A22	Digital Input 01
Digital Output 00	B21		A21	Digital Input 00
Analog Ground	B20		A20	Analog Ground
Analog Input 15	B19		A19	Analog Input 07
Analog Ground	B18		A18	Analog Ground
Analog Input 14	B17		A17	Analog Input 06
Analog Ground	B16		A16	Analog Ground
Analog Input 13	B15		A15	Analog Input 05
Analog Ground	B14		A14	Analog Ground
Analog Input 12	B13		A13	Analog Input 04
Analog Ground	B12		A12	Analog Ground
Analog Input 11	B11		A11	Analog Input 03
Analog Ground	B10		A10	Analog Ground
Analog Input 10	B09		A09	Analog Input 02
Analog Ground	B08		A08	Analog Ground
Analog Input 09	B07		A07	Analog Input 01
Analog Ground	B06		A06	Analog Ground
Analog Input 08	B05		A05	Analog Input 00
Analog Ground	B04		A04	Analog Ground
Analog Output 03	B03		A03	Analog Output 01
Analog Ground	B02		A02	Analog Ground
Analog Output 02	B01		A01	Analog Output 00



The numbers in square brackets [ ] are pin numbers designated by HONDA TSUSHIN KOGYO CO., LTD.

Figure 7. Pin Assignments of Interface Connector (CN1) < 1/2 >

Analog Input 00 - Analog Input 15	Analog input signal. The numbers correspond to channel numbers.
Analog Output - Analog Output 03	Analog output signal. The numbers correspond to channel numbers.
Analog Ground	Analog ground for analog input / output signals.
Digital Input 00 - Digital Input 07	Digital input signal. The numbers correspond to channel numbers.
Digital Output 00 - Digital Output 07	Digital output signal. The numbers correspond to channel numbers.
Digital Ground	Digital ground common to digital input / output signal, external trigger input signal, external sampling clock input signal, counter input / output signal.
AI External Sampling Clock Input	External sampling clock input signal for analog input.
AI External Stop Trigger Input	External trigger input signal for stopping analog input sampling.
AI External Start Trigger Input	External trigger input signal for starting analog input sampling.
AI Control Signal Output00 - AI Control Signal Output01	Control signal for analog input. The numbers correspond to channel numbers.
AO External Sampling Clock Input	External sampling clock input signal for analog output.
AO External Stop Trigger Input	External trigger input signal for stopping analog output sampling.
AO External Start Trigger Input	External trigger input signal for starting analog output sampling.
AO Control Signal Output00 - AO Control Signal Output01	Control signal for analog output. The numbers correspond to channel numbers.
CNT Input A0 - CNT Input A1	Counter A-phase input signal. The numbers correspond to channel numbers.
CNT Input B0 - CNT Input B1	Counter B-phase input signal. The numbers correspond to channel numbers.
CNT Input Z0 - CNT Input Z1	Counter Z-phase input signal. The numbers correspond to channel numbers.
CNT Output 00 - CNT Output 01	Counter output signal. The numbers correspond to channel numbers.
Plus common 00 - Plus common 01	Plus common. The numbers correspond to channel numbers.
Minus common 00 - Minus common 01	Minus common. The numbers correspond to channel numbers.
N.C.	No connection to this pin.

Figure 7. Pin Assignments of Interface Connector (CN1) < 2/2 >

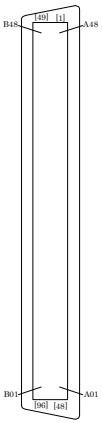
⚠ CAUTION

- There is a difference in pin assignments between CN1 and CN2 so you need to connect the cable carefully. If you do not so, it may cause failure.
- Do not connect any of the outputs and power outputs to the analog or digital ground. Neither connect outputs to each other. Doing either can result in a fault.
- If analog and digital ground is shorted together, noise on the digital signals may affect the analog signals. Accordingly, analog and digital ground should be separated.

Connector Pin Assignment on Analog I/O Board (CN2)

Pin Assignments of Interface Connector (CN2)

Analog Output 02	B48		A48	Analog Output 00
Analog Ground	B47		A47	Analog Ground
Analog Output 03	B46		A46	Analog Output 01
Analog Ground	B45		A45	Analog Ground
Analog Input 08	B44		A44	Analog Input 00
Analog Ground	B43		A43	Analog Ground
Analog Input 09	B42		A42	Analog Input 01
Analog Ground	B41		A41	Analog Ground
Analog Ground	B40		A40	Analog Ground
Analog Ground	B39		A39	Analog Ground
Analog Input 10	B38		A38	Analog Input 02
Analog Ground	B37		A37	Analog Ground
Analog Input 11	B36		A36	Analog Input 03
Analog Ground	B35		A35	Analog Ground
Analog Ground	B34		A34	Analog Ground
Analog Ground	B33		A33	Analog Ground
Analog Input 12	B32		A32	Analog Input 04
Analog Ground	B31		A31	Analog Ground
Analog Input 13	B30		A30	Analog Input 05
Analog Ground	B29		A29	Analog Ground
Analog Ground	B28		A28	Analog Ground
Analog Ground	B27		A27	Analog Ground
Analog Input 14	B26		A26	Analog Input 06
Analog Ground	B25		A25	Analog Ground
Analog Input 15	B24		A24	Analog Input 07
Analog Ground	B23		A23	Analog Ground
Analog Ground	B22		A22	Analog Ground
Analog Ground	B21		A21	Analog Ground
Digital Ground	B20		A20	Digital Ground
Digital Ground	B19		A19	Digital Ground
Digital Output 00	B18		A18	Digital Input 00
Digital Output 01	B17		A17	Digital Input 01
Digital Output 02	B16		A16	Digital Input 02
Digital Output 03	B15		A15	Digital Input 03
Digital Output 04	B14		A14	Digital Input 04
Digital Output 05	B13		A13	Digital Input 05
Digital Output 06	B12		A12	Digital Input 06
Digital Output 07	B11		A11	Digital Input 07
AO Control Signal OutPut00	B10		A10	AI Control Signal OutPut00
AO Control Signal OutPut01	B09		A09	AI Control Signal OutPut01
Digital Ground	B08		A08	Digital Ground
AO External Sampling Clock Input	B07		A07	AI External Sampling Clock Input
AO External Stop Trigger Input	B06		A06	AI External Stop Trigger Input
AO External Start Trigger Input	B05		A05	AI External Start Trigger Input
CNT Input A1	B04		A04	CNT Input A0
CNT Input B1	B03		A03	CNT Input B0
CNT Input Z1	B02		A02	CNT Input Z0
CNT Output 01	B01		A01	CNT Output 00



The numbers in square brackets [ ] are pin numbers designated by HONDA TSUSHIN KOGYO CO., LTD.

Figure 8. Pin Assignments of Interface Connector (CN2) < 1/2 >

Analog Input 00 - Analog Input 15	Analog input signal. The numbers correspond to channel numbers.
Analog Output 00 - Analog Output 03	Analog output signal. The numbers correspond to channel numbers.
Analog Ground	Analog ground for analog input / output signals.
Digital Input 00 - Digital Input 07	Digital input signal. The numbers correspond to channel numbers.
Digital Output 00 - Digital Output 07	Digital output signal. The numbers correspond to channel numbers.
Digital Ground	Digital ground common to digital input / output signal, external trigger input signal, external sampling clock input signal, counter input / output signal.
AI External Sampling Clock Input	External sampling clock input signal for analog input.
AI External Stop Trigger Input	External trigger input signal for stopping analog input sampling.
AI External Start Trigger Input	External trigger input signal for starting analog input sampling.
AI Control Signal Output00 - AI Control Signal Output01	Control signal for analog input. The numbers correspond to channel numbers.
AO External Sampling Clock Input	External sampling clock input signal for analog output.
AO External Stop Trigger Input	External trigger input signal for stopping analog output sampling.
AO External Start Trigger Input	External trigger input signal for starting analog output sampling.
AO Control Signal Output00 - AO Control Signal Output01	Control signal for analog output. The numbers correspond to channel numbers.
CNT Input A0 - CNT Input A1	Counter A-phase input signal. The numbers correspond to channel numbers.
CNT Input B0 - CNT Input B1	Counter B-phase input signal. The numbers correspond to channel numbers.
CNT Input Z0 - CNT Input Z1	Counter Z-phase input signal. The numbers correspond to channel numbers.
CNT Output 00 - CNT Output 01	Counter output signal. The numbers correspond to channel numbers.
Plus common 00 - Plus common 01	Plus common. The numbers correspond to channel numbers.
Minus common 00 - Minus common 01	Minus common. The numbers correspond to channel numbers.
N.C.	No connection to this pin.

Figure 8. Pin Assignments of Interface Connector (CN2) < 2/2 >

⚠ CAUTION

- There is a difference in pin assignments between CN1 and CN2 so you need to connect the cable carefully. If you do not so, it may cause failure.
- The signal names on the CN2 correspond to those on the CN1. Therefore, the input signals on the CN2 are actually the output signals from the CN1, and the output signals are the CN1 input signals.
- Avoid causing a short-circuit by connecting the input signals with the analog ground or the digital ground. Also, avoid connecting the input signals to each other. Doing either can result in a fault.
- Unused output signals must be short-circuited with the ground, for stable operation.

Inserting to the box for the signal conversion board

Insert this product referring to the documentation of the box for the signal conversion boards.

Board/Card Connection

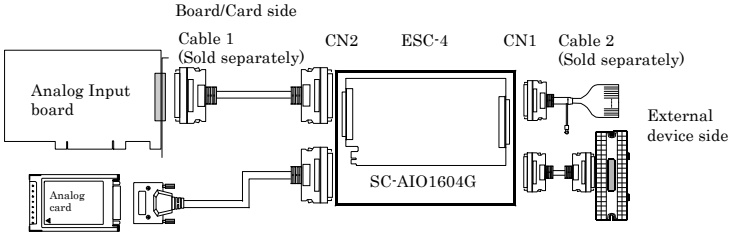


Figure 9. Connecting to the board / card

Correspondence Products (Optional)

Analog M series : AIO-121601M-PCI*1

Analog F series : AIO-163202F-PE*1, ADA16-32/2(PCI)F*1, ADA16-32/2(CB)F*2

Analog L series : AI-1664LA-LPE*2, AD16-64(LPCI)LA*2
The user must prepare the connecting cable about a product other than the above. For more details on signal pin assignment, refer to the manual of board that you use.

*1 PCB96PS-0.5P, PCB96PS-1.5P optional cable is required separately.

*2 ADC-68M/96F optional cable is required separately.

Box (Optional)

Box for signal conversion board : ESC-4 *1

*1 ESC-4 is required to use this product.

Cables (Optional)

< External device side (CN1) and analog I/O board side (CN2) >

Shield Cable with 96-Pin Half-Pitch Connectors at Both Ends
: PCB96PS-0.5P (0.5m)
: PCB96PS-1.5P (1.5m)

< External device side (CN1) >
Shield Cable with 96-Pin D-SUB Connector at One End
: PCA96PS-0.5P (0.5m)
: PCA96PS-1.5P (1.5m)

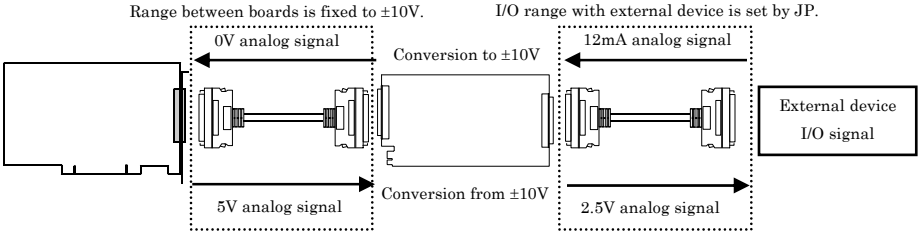
< Analog I/O board side (CN2) >

68/96-pin conversion shielded cable for analog input/output
: ADC-68M/96F (0.5m)

Signal Conversion

This product performs signal conversion as illustrated below and corresponds to several kinds of signal sources.

Input : Using example in 4 - 20mA
Output : Using example in ±5V



Input Signal Conversion

Voltage to be input is fixed to ±10V so you cannot use input value as it is. It is necessary to convert input value according to range to be used.

You can convert input value by using the formula as illustrated below.

$$A = \frac{(B + z)y}{20} - x$$

A : Input value from external device

B : Conversion value from signal conditioner

Range to be used	x	y	z
±10 [V]	10	20	10
±5 [V]	5	10	10
±2.5 [V]	2.5	5	10
0 - 10 [V]	0	10	10
0 - 5 [V]	0	5	10
4 - 20 [mA]	0	16	15

Conversion example

Conversion of input value when you use range 4 - 20[mA] and 0[V] is input to board is as follows.

$$A = \frac{(B + z)y}{20} - x$$

$$A = \frac{(0 + 15) \times 16}{20} - 0$$

$$A = 12[mA]$$

Output Signal Conversion

Voltage to be output is fixed to ±10V so you cannot use output value as it is. It is necessary to convert output value according to range to be used.
You can convert output value by using the formula as illustrated below.

$$B = \frac{(A + x) \times 20}{y} - z$$

A : Output value to be output from signal conditioner to external device
B : Output value from board to be output the output value of A

Range to be used	x	y	z
±10 [V]	10	20	10
±5 [V]	5	10	10
±2.5 [V]	2.5	5	10
0 - 10 [V]	0	10	10
0 - 5 [V]	0	5	10
4 - 20 [mA]	0	16	15

Conversion example

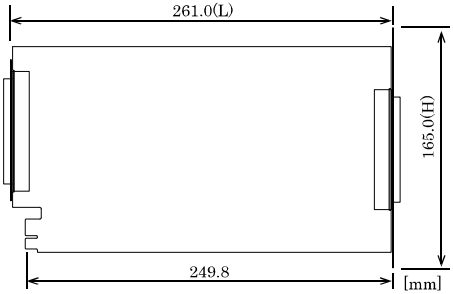
Conversion of output value when you use range ±5[V] and 2.5[V] is output to external device is as follows.

$$B = \frac{(A + x) \times 20}{y} - z$$

$$B = \frac{(2.5 + 5) \times 20}{10} - 10$$

$$B = 5[V]$$

Physical Dimensions



- The (L) of the physical dimensions corresponds to the length from the outer surface of the slot cover to the outside of the opposite slot cover.
- The (H) of the physical dimensions corresponds to the length between the upper and the lower ends of the slot cover.

Figure 10. Physical Dimensions

Specifications

The following specification shows the signal for the signal conversion. For more details on the other signal, refer to the spec. of analog I/O board to be used or connector pin assignment. For the connector pin assignment on external device (CN1) and on analog I/O board (CN2), refer to the page 8, "Connection Method".

Table 1. Specifications

Item			Specification
Analog I/O			
	Number of input channels *1		Single-Ended Input 16 channel
	Number of output channels *1		4 channel
	I/O range		External device side (CN1) : Bipolar ±10V, ±5V, ±2.5V, Unipolar 0 - 10V, 0 - 5V, 4 - 20mA (Supports range settings via jumper for each channel) Analog I/O board side (CN2) : Bipolar is fixed to ±10V. *2
	Input bandwidth		500kHz (Max.)
Counter			
	Counter section		
		Number of channels *1	2 channel
		Counter input signal	Phase-A/UP : 1 x 2 channel, Phase-B/DOWN : 1 x 2 channel, Phase-Z/CLR : 1 x 2 channel
		Response frequency	When using TTL 1MHz (Phase difference 4MHz), When using Optocoupler isolation 500kHz
		Input specification	External device side (CN1) : Non-isolated TTL level or Optocoupler isolated input (12 - 24VDC) (set by jumper) Analog I/O board side (CN2) : Non-isolated TTL level
	Control output section		
		Output specification	External device side (CN1) : Non-isolated TTL level or Optocoupler isolated output (12 - 24VDC) (set by jumper) Analog I/O board side (CN2) : Non-isolated TTL level
Common section			
	Adjustment accuracy		±1mV (Max.) *3 *4
	Connector		96-pin half pitch connector [F(Female)type] x 2 PCR-E96LMD+ [HONDA TSUSHIN KOGYO CO., LTD.] or equivalence to it
	Operating conditions		0 - 50ºC, 20 - 80%RH (No condensation)
	Current consumption		2800mA
	Physical Dimensions (mm)		261(L) x 165(H)
	Weight		340g

1： The number of available channel depends on the analog input board to be used.

2： External signal output from board is fixed to ±10V in any range.
External signal input to board is fixed to ±10V in any range.

3： There may be maximum of ±1mV error during a full-scale use.

4： An error approximately 0.15% of full-range may occur when operated at 0ºC or 50ºC ambient temperature.

SC-AIO1604G

User's Manual

CONTEC CO., LTD.

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